

Optical Power Meter Software Interface for the WinSpec Application

Philip A. Wilk¹, Zachary S. Radding², Heino Nitsche¹

1. Actinide (Nitsche) Group, Chemical Sciences Division

2. Design Works, Engineering Division

Introduction

The WinSpec software package, sold by Roper Scientific, is a versatile spectral acquisition application for their spectrograph systems. They say the following in their product literature [Roper 2002]:

“Princeton Instruments WinSpec is Roper Scientific's 32-bit Windows® software package for spectroscopy. It provides stand-alone comprehensive spectral acquisition, display, processing, and archiving functions. WinSpec gives you the ability to run automatic spectrometer control and calibration routines, as well as to move to any spectral window or change gratings without having to recalibrate. WinSpec also features snap-ins to permit easy user customization of any function or sequence.”

The functionality of the WinSpec software suite has been very adequate for our data acquisition needs, except for lacking one critical function. The WinSpec software does not come ready to accept data from a laser power meter that would allow for the store of total relative or absolute laser energy delivered to the sample. This is critical information because most laser systems do not deliver reliably consistent light to the target. With our system, a Spectra-Physics MOPO tunable laser system [Spectra 2002], we have noticed considerable fluctuations between individual laser shots, and also longer-term energy degradation as the laser system become equilibrated over the course of several hours. Since this is data that is normally necessary for analytical experiment, we

were very surprised to find that this functionality was included with the software application. Since it is unreliable to record this data by hand, and impossible to do shot-to-shot, it was necessary to have this functionality added to the WinSpec software.

Laser Power Meter

Lawrence Berkeley National Laboratory's Engineering Division has a group called the "Design Works" [Design 2002], that can provide engineering support to small projects such as this at the lab. They were able to respond very quickly to our request, and



Figure 1 Newport 1835-C Optical Power Meter

provide a software interface for our Newport 1835-C optical energy meter (see Figure 1), that would work with our existing WinSpec software package.

It was determined that the WinSpec "snap-ins" that they advertise as supplying customizable functionality for just such a purpose, were completely unsuitable for this task. In addition, a large portion of the required snap-in code was missing in various releases of their WinSpec package, and also incorrectly registered itself with the Windows operating system. A significant portion of time was spent dealing with issues relating to the WinSpec software package itself. In the end, it was decided that a stand alone Visual Basic program would be used to initiate the experiment in WinSpec, collect the optical energy meter data, and transfer the data to the WinSpec spectrum data record. Visual Basic (Microsoft Corporation) was used because at this point a portion of code had already been written before the decision to abandon the snap-in had been made, and also Visual Basic allows for easy access to the running WinSpec spectrum data record.

The Newport 1835-C optical energy meter has two serial port outputs, one RS-232 and one GPIB. The LPM app. uses the RS-232 serial port for communicating with the power meter. The application works without flaw if it is run under the Windows 2000 operating system. It was found that if it was running under Windows 98, the operating system caused significant latency issues that cause the application to miss data. The laser operates at 10 Hz, and the LPM app. polls the serial port at just under twice this fast. It is possible that if the Windows 98 operating system was preoccupied with something else it would not allow the LPM app. to poll the serial point at the appropriate moment.

The Laser Power Meter application (LPM app.) is started independently from the WinSpec application, however it will startup WinSpec if it is not already running. The LPM app. user interface consists of three text boxes and two buttons (see Figure 2). The first two boxes are not user modifiable, and display the total accumulated energy

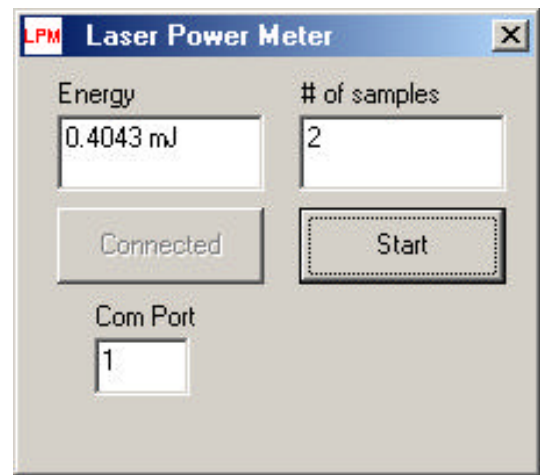


Figure 2 Laser Power Meter Control Panel

on the detector as well as the total accumulated laser shots. The third text-box, refers to which RS-232 serial port the optical energy meter is attached to, and can be changed by the user. The two buttons re-connect the application to the power meter if communication is interrupted, and the other button initiates the experiment. In the screen-shot (see Figure 3) you can see the LPM app. running concurrently with WinSpec. In this figure, the file information window has also been opened up showing the total energy accumulation data that has been inserted into the

comment section of the file, by the LPM application. This information is saved with the file and can be retrieved at any time in the future.

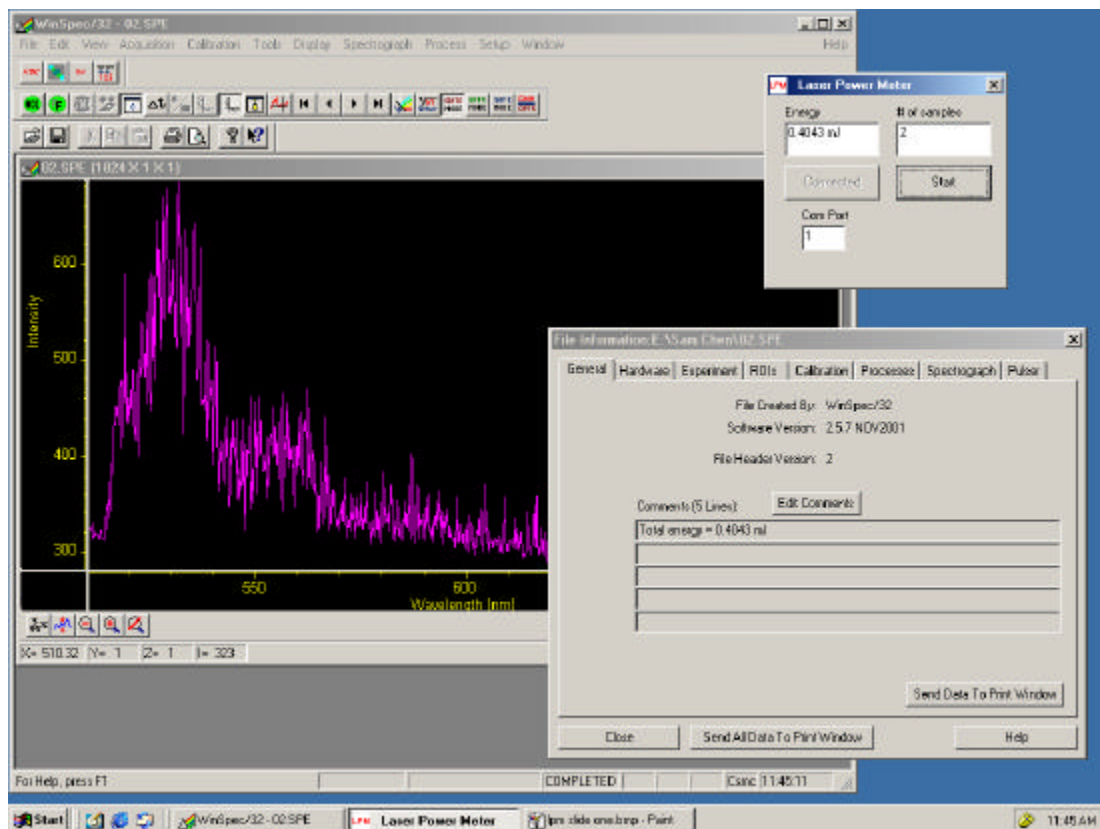


Figure 3 LPM application running with WinSpec.

References

- [Design 2002] <http://dw.lbl.gov/> (2002).
- [Roper 2002] http://www.roperscientific.com/software_winspec.html (2002).
- [Spectra 2002] http://www.spectraphysics.com/products/isl_products/mopo.html (2002).